

Remarks:

This amendment is submitted in an earnest effort to advance this case to issue without delay.

Claims 30 to 44 have been added to the original fourteen claims 16-29. These new claims mainly recite to subcombinations of features in the existing claims. Thus the case now has 29 claims of which three (16, 34, and 40) are independent. A PTO-2038 covering the fee for nine extra claims is enclosed herewith.

The invention here relates to a method of making a packaging web from PET recovered from scrap using a double-screw extruder.

In practice it is known to recycle PET in a fairly expensive and complex process. First the PET scrap is crystalized and then dried, which processes reduce the quality of the PET. Since the process is discontinuous it is only possible to determine at a later time whether the resultant PET is good enough to use. It is hence known that fibers or filaments made from recycled PET are of inferior quality compared to such fibers or filaments made from virgin PET. Furthermore processes are known whereby wet PET material is worked under vacuum in an extruder. This method is only, however, usable to make PET pellets. IT is furthermore disadvantageous that recycled PET includes considerable impurities that are hard to extract from a polymer melt.

These problems are satisfactorily avoided with the method of this invention. In a method that completely avoids the expensive and quality-reducing preparation steps for the PET scrap. Thus the independent claims all now specify that the waste PET is fed into the extruder "with no substantial pretreatment," something that was not done in the past. Hence the method of this invention is cheaper to carry out and produces a better product. The backflushing step is used to get rid of the dirt or other impurities that are inherently part of the chopped up bottles or the like that are the starting product.

The invention is rejected on US 6,409,949 of Tanaka in view of any of five other references.

Tanaka relates to a method of treating polyester by first drying and then thickening it. The thickener adds a chain-lengthening substance to the polymer melt to increase its viscosity. The drying and thickening steps can both be done in a double-screw extruder or separate devices. The thus treated polyester is turned into pellets. Thus Tanaka shows that it is known to turn PET waste into pellets, but not that it is known to make recycled PET into a packaging web. In addition there is no suggestion here to pass the melt through a sieve filter and to measure pressure upstream and downstream of the filter to control a filter-backflushing operation. No separation out of dirt is mentioned, nor would it be obvious or necessary since the product in Tanaka is pellets where some impurities are not a problem,

unlike in a fiber or filament where a small impurity can create a fragile and certain to break zone in the product.

Secondary reference, US 2,823,421 of Scarlett, relates to a method of stretching a PET film in two orthogonal directions in its plane. The PET melt is made into a film by extruding it through a slot onto a cooling drum, and then the film is passed over rollers to stretch it. Clamps engage the edge of the film to stretch it transversely. There is no filter, no backflushing, no pressure sensing and control, and practically nothing in Scarlett relevant to the instant invention except the idea of making a PE strip. The recycling of PET is not part of the Scarlett disclosure.

US 5,176,861 of Ishikawa is more relevant in that this reference describes a method making a film from recycled PET. The starting material is fed in undried condition to an extruder that uses a vacuum to dry it. The melted PET is made into a film and fed to a stretcher. There is no mention of a packaging web, as specifically claimed in this application, nor is there any suggestion to add a chain lengthener at the extruder. There is also no filter with upstream and downstream pressure sensors capable of determining when the filter is getting clogged so that it can be backflushed. All Ishikawa discloses is the production of a low-viscosity polyester melt to make a film, whose flexibility and strength are such that the film would be unusable as a packaging web. Ishikawa is silent as to what to do with any dirt in the PET waste.

US 6,153,093 of Bentivoglio actually discloses a filter connected to an extruder to sieve the stream issuing from the extruder. A sort of backflushing system is used that uses a pulsed pressure reversal to clear particles off the upstream face of the filter. There is no discussion of monitoring pressure upstream and downstream of the filter and backflushing it in accordance with the pressure differential across the filter. This method is particularly effective since it only backflushes the filter when this is needed. If the melt is relatively clean, backflushing is done infrequently, whereas if a very dirty batch of PET waste is being processed the system can react as soon as the filter starts getting clogged enough to impair output rate. With Bentivoglio the backflushing is simply done periodically, presumably at a rate that is fast enough to keep the filter clean with very dirty PET, but that is much more often than needed with cleaner recycled waste. There is no discussion in Bentivoglio of a chain lengthener, or a packaging web. Furthermore there is no control of the extruder based on downstream pressure sensors.

The literature reference of Rosato merely relates to various generic procedures of extruding plastic, including a system usable with dirty starting material. Backflushing is generically mentioned, but not with the pressure monitoring and control of the instant invention. Rosato is largely cumulative to Bentivoglio and offers no teaching beyond those of Bentivoglio.

The last secondary reference, US 4,849,113 of Hills, describes a filter having tow parallel strip filters that are each

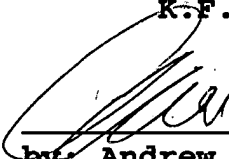
traversed by a hot plastic stream. pressure sensors are provided upstream and downstream of the filters to detect blockages. When one of the filters is determined to be blocked, flow through it is reduced to let the filter pull off a downstream support so that a new strip of filter material can be moved into position. There is nothing resembling backflushing; indeed this system is complexly built to make such backflushing unnecessary. This reference also does not mention a packaging web or a chain lengthener. Instead Hills relates to the manufacture of pellets where flexibility and strength are largely irrelevant.

Taking all six references together it is difficult or impossible to reconstruct the instant invention. The idea of measuring pressure upstream and downstream a filter to control an extruder is not shown in any reference, nor is such pressure control of a backflushing operation suggested. The chain lengthener is only hinted at in one reference, and only with regard to a different product. Thus the §103 rejection on the combined teachings of the six reference must fall. In fact it is arguable whether a rejection of a one-page claim with six references begs the question of obviousness.

For these reasons all the claims in the case are clearly in condition for allowance and passage to issue. Notice to that effect is earnestly solicited.

If only minor problems that could be corrected by means of a telephone conference stand in the way of allowance of this case, the examiner is invited to call the undersigned to make the necessary corrections.

Respectfully submitted,  
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Enclosure: Request for extension (one month)  
PTO-2038 (9 extra dep. claims)